

REMARKS

Applicants respectfully request reconsideration of the present application in view of the foregoing amendments and in view of the reasons that follow. Claims 1-25 were previously canceled, and Claims 26-53 were added. Claims 26, 28, 35, 38, 46-49, 51, and 53 have been amended. Claims 26-53 are pending in this application.

I. Rejection of Claims 26, 27, 30, 31, 35, 36, 39, 40, 44-49, and 51-53 Under 35 U.S.C. § 102

In section 5 of the Final Office Action, Claims 26, 27, 30, 31, 35, 36, 39, 40, 44-49, and 51-53 were rejected under 35 U.S.C. § 102(e) as being anticipated by U.S. Patent No. 6,560,445 to Fette *et al.* (*Fette*). Applicants have amended Claims 26, 28, 35, 38, 46-49, 51, and 53 without prejudice to or disclaimer of pursuing the subject matter of these claims in a continuation or other application. Applicants respectfully submit that *Fette* fails to teach, suggest, or disclose all of the elements of at least independent Claims 26, 35, 46, 47, 49, 51, and 53, as amended.

Claim 26 recites in part selecting a signal constellation, at a communication device, based on a channel estimation error. Claims 35, 46, 47, 49, 51, and 53, though of different scope, recite a similar feature.

In the Advisory Action, the Examiner states:

Fette discloses using multiple pieces of information to determine a constellation. As stated in the previous rejection of the claims, *Fette* discloses using channel state information to select a constellation. The SNR was the channel state information. However, *Fette* discloses additional channel state information is used in the method of selecting the signal constellation. The method is shown in figure 17. Column 9, lines 40-65 discloses receiver 1003R informs transmitter 1001T of previous constellation, cepstral lines, FEC and baud rate for current conditions. Any of this information can be considered channel state information.

Though Applicants respectfully disagree, Applicants respectfully submit that, even if a previous constellation, cepstral lines, FEC, and baud rate could be considered channel state information and the previous constellation, cepstral lines, FEC and baud rate were used to select a constellation, which they are not so used according to *Fette*, none of these parameters can be considered “a channel estimation error” as recited in independent Claims 26, 35, 46, 47, 49, 51, and 53 based on the plain language of the claim.

At column 9, lines 17-66, which includes the portion cited by the Examiner, *Fette* states:

Receiver 1003R includes a processor that initially, at step 901 selects a first SNR in the range of SNR for the expected communication environment of communication link 1005 (FIG. 18) is selected. For an expected 30 dB range of SNR over communication link 1005, a "do" loop is established for increments of the expected range. In the embodiment shown, 3 dB increments are utilized. A simulation creates typical noise and interference at step 903. The entropy of each cepstral coefficient is analyzed at step 905. In other words, at step 905, SNR is measured for each cepstral coefficient. At step 907 candidate constellations are selected. At step 909 the information carrying capacity of each constellation is analyzed under the SNR. At step 911, a constellation is selected that delivers the highest information rate subject to an upper bit error rate bound of the associated forward error correcting code. For example, assume that a Reed-Salomon error correcting code is used with the process and that it is capable of correcting bit error rates up to three per cent in the raw information. If a constellation raw bit error rate exceeds the error correcting capacity of the error correcting code, it would not be selected. The selected constellation will be the constellation that has the highest information throughput and does not exceed the raw bit error rate capacity of the error correcting code. At step 913, a selection is made of cepstral lines to use in the selected constellation. At step 915, an error correcting code is selected. The error correcting code may be any of a number of known error correcting codes. Steps 905 through 913 are repeated for all cepstral lines. Steps 901 through 915 are repeated for each SNR for the communication link 1005 environment. The result is a table or set of tables that permit automatic optimization of the communications link under varying conditions. At step 917 receiver 1003R (FIG. 18) determines if the link conditions are stable and signals mode changes as required to maintain the quality of communication. At step 919, receiver 1003R informs transmitter 1001T of constellation, cepstral lines, FEC, and baud rate for current conditions. At step 921, transmitter 1001T (FIG. 18) acknowledges receipt of the information. At step 923, transmitter 1001T switches to the selected mode on the next baud. As receiver 1003R assesses the performance of the demodulation constellation on a live signal, it selects a model of SNR nearest to the actually received SNR, and signals transmitter 1001T via transmitter 1003T and second link 1007 to receiver 1001R of selected constellations for that SNR. As transmitter 1001T shifts to that constellation, receiver 1003R

invokes the appropriate constellation for the current SNR, thereby enabling the maximum available throughput performance under current link conditions.

(Underlining and bolding added). Thus, according to *Fette*, the constellation is selected by identifying a SNR in the created “table or set of tables” (col. 9, ll. 46-47) that is closest to the actual received SNR. *Fette* further states that a constellation raw bit error rate is associated with the constellation and a constellation is not selected if the “constellation raw bit error rate exceeds the error correcting capacity of the error correcting code.” (Col. 9, ll. 35-37). The error correcting code is associated with the selected forward error correction (FEC) used to provide error control for the transmitted signal. Neither the SNR nor the constellation raw bit error rate is a channel estimation error, however.

The Examiner also points out that the transmitter receives information about the constellation, cepstral lines, FEC, and baud rate from the receiver. However, none of the “constellation, cepstral lines, FEC, and baud rate” are used to select the constellation and none are channel estimation errors. Instead, according to *Fette*, the constellation, cepstral lines, FEC, and baud rate are used to switch the selected mode. Thus, *Fette* describes selection of the constellation based on the SNR and a comparison between the constellation raw bit error rate and the error correcting capacity of the error correcting code selected. However, *Fette* fails to provide any teaching of at least “selecting a signal constellation, at a communication device, based on a channel estimation error” as recited in independent Claims 26, 35, 46, 47, 49, 51, and 53.

For at least this reason, Applicants respectfully submit that *Fette* fails to teach, suggest, or describe all of the elements recited in at least independent Claims 26, 35, 46, 47, 49, 51, and 53. A rejection under 35 U.S.C. § 102 cannot be properly maintained where the reference fails to teach each and every element of the rejected claims. The remaining claims depend from one of Claims 26, 35, or 47. For at least these reasons, Applicants respectfully request withdrawal of the rejection of Claims 26, 30, 35, 36, 39, 40, 44-49, 51, and 53.

II. Rejection of Claims 28, 29, 37, and 38 Under 35 U.S.C. § 103(a)

In section 6 of the Final Office Action, Claims 28, 29, 37, and 38 were rejected under 35 U.S.C. § 103(a) as being unpatentable over *Fette* in view of U.S. Patent Publication No. 2002/0090035 to Seshadri *et al.* (*Seshadri*). Applicants respectfully disagree because *Fette*

and *Seshadri*, alone and in combination, fail to teach, suggest, or disclose all of the elements of at least independent Claims 26 and 35 from which Claims 28, 29, 37, and 38 depend.

As discussed in Section I. above, *Fette* fails to teach, suggest, or disclose all of the elements of independent Claims 26 and 35. *Seshadri* fails to remedy the deficiencies of *Fette*.

Seshadri a method “used to generate set partitioning structures and trellis structures that enable code designers to systematically design the codes of the invention.” (Abstract). *Seshadri* states:

Once the rate has been selected, other aspects of the communications system and code are fixed. For example, a rate of 1 bit/second/hertz means that the system will have a constellation size of 2 (a BPSK system). A rate of 2 bits/second/hertz means the system will have a constellation size of 4 (a QPSK system). A rate of 3 bits/second/hertz means that the system will have a constellation size of 8 (an 8-PSK system). In general, the constellation size (L) will equal $2^{\text{sup.b}}$, where b represents the selected rate. Also, as described herein, once the rate is selected, the number of input bits provided to lookup table 506 is 2b. Thus, selecting a rate is an important design consideration.

(Para. [0083]; underlining added). Thus, according to *Seshadri*, the constellation can be selected based on a rate where the “selected rate represents the number of bits transmitted in a given period of time.” (Para. [0082]). However, *Seshadri* fails to provide any teaching of at least “selecting a signal constellation, at a communication device, based on a channel estimation error” as recited in independent Claims 26 and 35.

Thus, *Fette* and *Seshadri*, alone and in combination, fail to teach, suggest, or disclose all of the elements of at least independent Claims 26 and 35. An obviousness rejection cannot be maintained when the combination of references cited fails to teach each and every element recited in the claims. As a result, Applicants respectfully request withdrawal of the rejection of Claims 28, 29, 37, and 38, which depend from Claims 26 and 35.

III. Rejection of Claims 32, 41, and 50 Under 35 U.S.C. § 103(a)

In section 7 of the Final Office Action, Claims 32, 41, and 50 were rejected under 35 U.S.C. § 103(a) as being unpatentable over *Fette* in view of Dabak *et al.*, “Signal Constellations for Non-Gaussian Communication Problems”, Proceedings of the 1993 IEEE International Conference on Acoustics, Speech, and Signal Processing, April 27-30, 1993,

Minneapolis, Minnesota, 33-36 (*Dabak*). Applicants respectfully disagree because *Fette* and *Dabak*, alone and in combination, fail to teach, suggest, or disclose all of the elements of at least independent Claims 26, 35, and 49, from which Claims 32, 41, and 50 depend respectively.

As discussed in Section I. above, *Fette* fails to teach, suggest, or disclose all of the elements of independent Claims 26, 35, and 49. *Dabak* fails to remedy the deficiencies of *Fette*.

Dabak describes a “procedure for determining optimum signal sets.” (Abstract). *Dabak* states that “[o]ptimum signal constellations depend on signal-to-noise ratio.” (Abstract). *Dabak* further states that “[f]or small M, we can calculate optimal signal sets by maximizing the sum of all intersignal distance measures under a signal-related constraint.” (Page 34, Section 3). However, *Dabak* fails to provide any teaching of at least “selecting a signal constellation, at a communication device, based on a channel estimation error” as recited in independent Claims 26, 35, and 49.

Thus, *Fette* and *Dabak*, alone and in combination, fail to teach, suggest, or disclose all of the elements of at least independent Claims 26, 35, and 49. An obviousness rejection cannot be maintained when the combination of references cited fails to teach each and every element recited in the claims. As a result, Applicants respectfully request withdrawal of the rejection of Claims 32, 41, and 50, which depend from Claims 26, 35, and 49.

IV. Rejection of Claims 33, 34, 42, and 43 Under 35 U.S.C. § 103(a)

In section 8 of the Final Office Action, Claims 33, 34, 42, and 43 were rejected under 35 U.S.C. § 103(a) as being unpatentable over *Fette* in view of U.S. Patent No. 6,674,820 to Hui *et al.* (*Hui*). Applicants respectfully disagree because *Fette* and *Hui*, alone and in combination, fail to teach, suggest, or disclose all of the elements of at least independent Claims 26 and 35 from which Claims 33, 34, 42, and 43 depend.

As discussed in Section I. above, *Fette* fails to teach, suggest, or disclose all of the elements of independent Claims 26 and 35. *Hui* fails to remedy the deficiencies of *Fette*.

Hui a method “in which, over each synchronization signal period or other determinate information window, the channel coefficients and the color of the baseband noise are concurrently estimated.” (Abstract). *Hui* states:

To extract the transmitted signal (or symbols) from the received signal, the receiver of a mobile terminal typically includes a demodulator which may be a coherent demodulator such as a maximum likelihood sequence estimation (MLSE) demodulator (or equalizer). To adapt to the channel variation from each data burst to the next, an associated channel estimator is typically provided for the demodulator. The channel estimator typically operates using known transmitted symbols.

(Col. 1, ll. 57-65). However, *Hui* fails to provide any teaching of at least “selecting a signal constellation, at a communication device, based on a channel estimation error” as recited in independent Claims 26 and 35.

Thus, *Fette* and *Hui*, alone and in combination, fail to teach, suggest, or disclose all of the elements of at least independent Claims 26 and 35. An obviousness rejection cannot be maintained when the combination of references cited fails to teach each and every element recited in the claims. As a result, Applicants respectfully request withdrawal of the rejection of Claims 33, 34, 42, and 43, which depend from Claims 26 and 35.

V. Double Patenting Rejection

In section 9 of the Final Office Action, Claims 26, 27, 30-32, 35, 36, 39-41, and 45-53 were provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over Claims 41, 42, 45, 49, 50, and 57-58 of U.S. Patent Application No. 10/671,346. Applicants respectfully request that the double patenting rejection be held in abeyance until the pending claims are otherwise determined to be in condition for allowance. If the claims are otherwise found to be in condition for allowance, Applicants will review the claims at that time and determine whether a terminal disclaimer is appropriate.

Applicants believe that the present application is in condition for allowance. Favorable reconsideration of the application as amended is respectfully requested.

The Examiner is invited to contact the undersigned by telephone if it is felt that a telephone interview would advance the prosecution of the present application.

The Commissioner is hereby authorized to charge any additional fees which may be required regarding this application under 37 C.F.R. §§ 1.16-1.17, or credit any overpayment, to Deposit Account No. 19-0741. Should no proper payment be enclosed herewith, as by the credit card payment instructions in EFS-Web being incorrect or absent, resulting in a rejected

or incorrect credit card transaction, the Commissioner is authorized to charge the unpaid amount to Deposit Account No. 19-0741. If any extensions of time are needed for timely acceptance of papers submitted herewith, Applicants hereby petition for such extension under 37 C.F.R. §1.136 and authorizes payment of any such extensions fees to Deposit Account No. 19-0741.

Respectfully submitted,

Date October 7, 2009

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